



Intel® 31154 133 MHz PCI Bridge

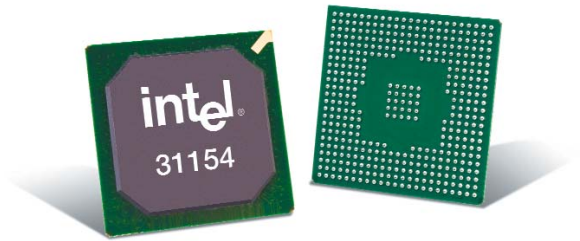
Enhanced Performance for Add-in Cards, Systems and Embedded Applications

Product Overview

The Intel® 31154 64-bit transparent bridge with opaque mode provides vendors of OEM systems, add-in cards and embedded applications with a high-performance, feature-rich 4th-generation PCI bridging device. The bridge is designed for applications that require high bandwidth, multi-PCI slot expansion, bus frequency isolation and enhanced multi-function device/component connectivity.

The 31154 bridge provides many unique features including PCI/PCI-X compatibility, 5V tolerance, CompactPCI* hot swap support, large 8-Kbyte dynamic buffers, flow-thru support, up to 10 secondary clocks, support for 9 to 24 concurrent transactions, customizable device ID, semi-transparency and a Multiple Transaction Timer, which is a first for PCI bridges.

PCI-X parallel bus architecture extends frequency/bandwidth capabilities where traditional PCI capabilities leave off to keep pace with today's higher performing CPUs and host systems. Running identical 64-bit wide, 66 MHz system speeds and using 4 KB reads, the PCI-X protocol provides significantly improved throughput compared to PCI mode in the same system. Such performance gains are primarily due to the PCI-X protocol's split transaction read/write cycle, which reduces latency to

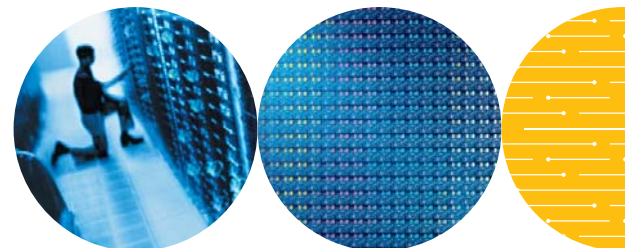


improve throughput and bus efficiency. In addition to 66 MHz, the PCI-X specification also supports 100 MHz and 133 MHz bus speeds for a maximum theoretical bandwidth of 1 GB/sec.

The extensive capabilities of the Intel 31154 enable designers to use the same bridge to flexibly address a wide variety of PCI/PCI-X bridging requirements. In applications that require higher bandwidth and bus isolation, the bridge enables full 1 GB/sec bandwidth PCI-X data transfers at 133 MHz bus speeds on both primary and secondary bus segments.

The performance-oriented design and enhanced feature set of the 31154 bridge, combined with the inherent advantages of the PCI-X architecture, affords designers the opportunity to develop PCI or PCI-X-based products with more capabilities, flexibility and throughput than ever before.

Intel in
Communications



The Intel 31154 bridge is designed to be backward compatible with legacy 5V 33 MHz legacy PCI devices, in addition to the latest high-bandwidth 133 MHz PCI-X embedded platforms or add-in cards. The bridge supports up to 9 bus masters and features large dynamic transaction buffers for improved concurrency and interconnectivity. In addition, the 31154 can handle asynchronous independent buses in PCI mode running anywhere between 0 and 66 MHz speeds.

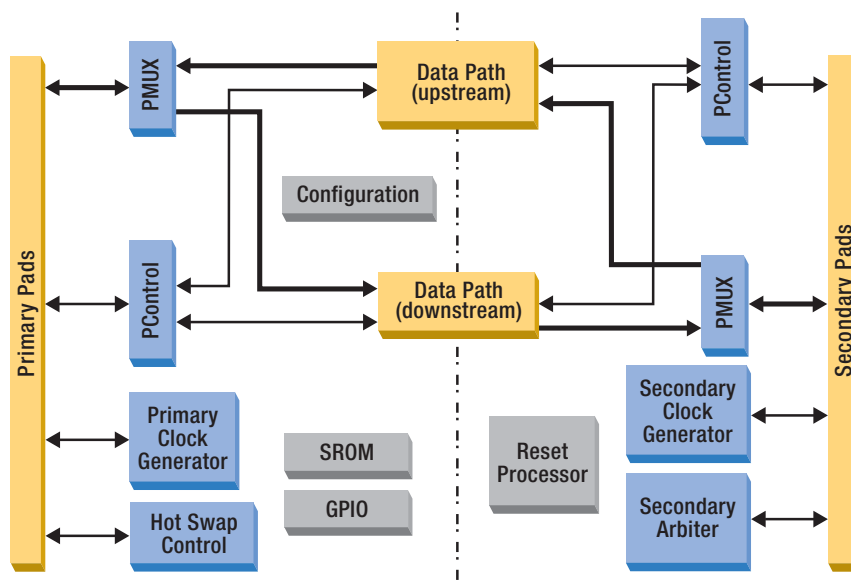
The 31154 is also optimized for 128-byte block data transfers and features an opaque memory *semi-transparent* mode for isolating devices on secondary bus segments. This feature is particularly useful for intelligent host subsystems. The 31154 enables the implementation of homogeneous or mixed PCI/PCI-X bus extension, bus/device isolation and cascading for a variety of add-in cards, intelligent subsystems.

Features

Benefits

Transparent 64-bit PCI-X v1.0b bridge	Full compliance with PCI SIG PCI-X specification enables a theoretical maximum data transfer rate of 1 GB/sec
Fully PCI v2.3-compliant including delayed transactions	In addition to supporting PCI-X 66, 100 and 133 MHz operation, the bridge automatically senses and “downshifts” to PCI 33 and 66 MHz speeds
Secondary bus arbitration support of up to 9 bus master devices	The maximum number of devices can be connected to PCI or PCI-X bus segments for “high-density” applications and high concurrency of transactions over the bus
5V tolerance	The bridge is compatible with legacy PCI 33 MHz devices requiring 5 Volts, in addition to supporting 3.3V signal I/O
8-Kbyte fully dynamic transaction buffers	Large read/write data transaction buffers enable large block transfers and multiple requests (128-byte blocks)
Asynchronous Independent Buses	The ability to support variable frequencies between 0 – 66 MHz in PCI mode enables increased device attach flexibility
Multi Transaction Timer (MTT)	This unique feature grants requests to devices with smaller data block transfers to eliminate large block transfer “bus bias”
CompactPCI® hot swap	Cards can be removed or inserted without requiring system shutdown or interruption
Opaque memory mode	This feature allocates separate memory partition for private devices on the secondary bus side for <i>semi-transparent</i> bridge operation
Masquerade mode	This is a unique mechanism to allow customization of the vendor, device and rev ID fields
Buffer flush mechanism	This clears all data transactions in buffer during failover for Redundant System Slot (RSS) operation
Power management	The bridge is compliant with ACPI and PCI bus power-management specifications

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Key Applications

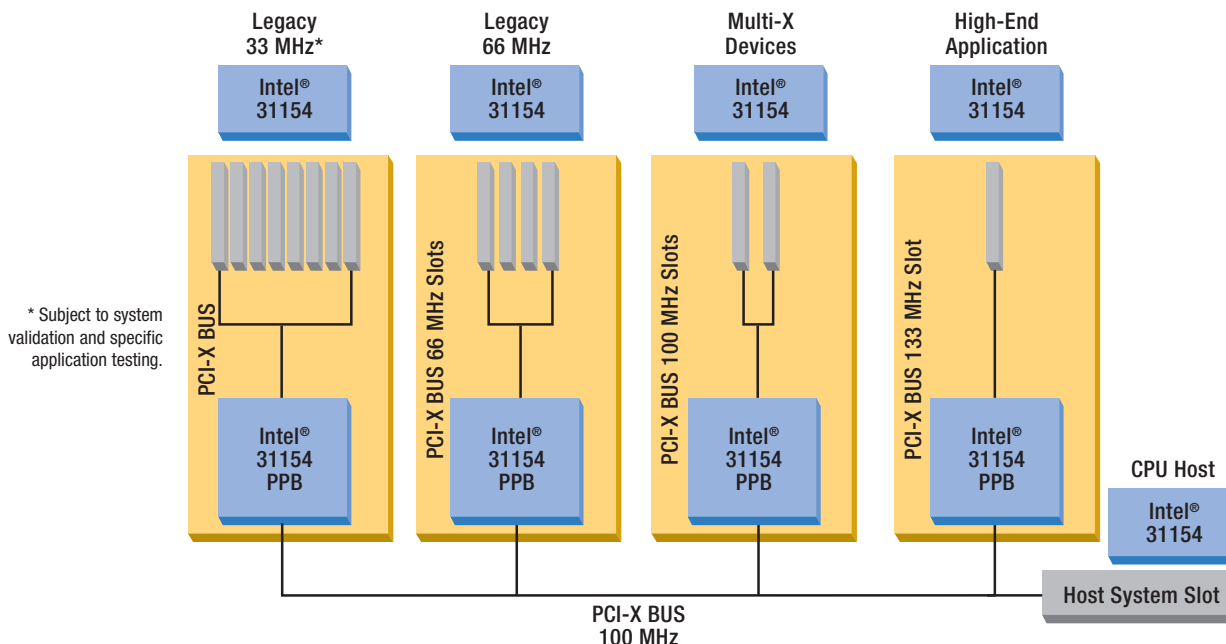
- **PCI-X High Bandwidth** – provides theoretical maximum data transfer rate of up to 1 GB/sec for moving data in multi-media/video streaming, GbE, SCSI, Fibre Channel or other high performance applications in add-in cards or systems.
- **Backplane/Bus Partitioning** – enables PCI-X backplane configurations and partitioning for a maximum number of PCI and PCI-X add-in slots/cards to ensure the highest system performance and interconnectivity in blade server or embedded communications applications.
- **Frequency Isolation** – allows asynchronous operation of the primary and secondary buses.
- **Addition of Intelligent Subsystems** – using the opaque mode to allow the mapping of a separate device memory region that is visible only to the bridge and the local bus.
- **System Customization** – The bridge's *masquerade* feature permits the reuse of drivers for system cards that are hard-coded for existing legacy bridges, in addition to customization for proprietary systems and slots through the use of a custom ID in the 31154 bridge.

Intel Advantage

Intel is the leader in PCI bridging integration and interoperability, with millions of PCI bridges sold to date. The Intel 31154 transparent bridge represents Intel's fourth generation of bridge products, complementing the successful 21152 and 21154 transparent bridges and the 21555 non-transparent bridge.

Intel is a leading supplier of communications building blocks, adding value at many levels of integration. Through continuous innovations and advancements in connectivity and processing in the network, Intel is delivering, along with its customers and developer community, a wide choice of solutions that enable faster time-to-market, longer time-in-market and increased revenue opportunity.

Intel® 31154 Bridge Enables PCI-X Backplane Expansion with Separate Bus Domains



Specifications

Characteristic	Specification
■ Power supply	Vdd = 1.3V (core) + V/I/O = 5V or 3.3V
■ Operating temperature range	0° C to 85° C (case under bias)
■ Storage temperature range	-55° C to 80° C
■ Power dissipation	2.5 Watts max
■ Package	421-pin PBGA, 31 x 31mm

Evaluation Design Kit Improves Time-to-Market

Intel offers a 31154 Evaluation Design Kit that includes the tools add-in card vendors need to quickly bring 31154-based products to market. The kit contains a PCI-X evaluation board featuring one 31154 with two PCI-X slots on the secondary bus, documentation, tools, and schematics. Please contact your sales rep or distributor to order the kit. Documentation is also available online.

Intel Access

Developer's Site:	developer.intel.com
Bridges Page:	developer.intel.com/design/bridge
Intel® Technical Documentation Center:	appzone.intel.com/literature/index.asp (800) 548-4725 7 a.m. to 7 p.m. CST (U.S. and Canada) International locations please contact your local sales office.
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